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# The Online Test Bank Management System in Integration Model

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**Abstract**

Good quality Test is an important part of learning system. That can be used to evaluate student achievement according to each subject objectives. Moreover, it can be used by students to self-determine their content understanding at the end of each chapter and report weaknesses of each student. This research, The Online Test Bank Management System in Integration Model not only creating an online test bank management system to enable the creation and analysis of tests, but also integrated with online lessons to provide the contents which are not understood by students to help them improve their achievement effectively. The Online Test Bank Management System in Integration Model consists of two parts: 1)Website management, and 2)Test bank management. The population of this study is instructors and all students study in Traimitrwittayaram of Suan Sunandha Rajabhat University who have registered in the year 2014, which has a total of 102 students and 4 instructors. The user of this system is divided into three types: 1)The Administrator who manage the site and assign each user's right. 2)The Instructor who make the test and related online lesson. and 3)The Student who learn subject contents and tested by the system. There are 4 subjects in this research which are Data Communication and Networking, Operating System, Object-Oriented Software Development and Advanced Database. Each subject test has 150 items with 5 choices and was used to test students in both before and after learning. Then each subject test was analyzed and the result show that: There are 126 136 126 and 132 good quality items in 4 subject tests respectively. The difficulty index and discriminant index of each subject test is good or very good with validity value higher than 0.9 and the value of reliability ranged from 0.96 to 0.98. Students with low achievement score are reported and suggested to review the online lessons related to their weakness and after the students has reviewed the suggested online lesson they were tested again and result show that their achievement was improved significantly.

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## 1. Introduction

Many teaching as it is today lack of standards and reliable assessment of learning. In most case the achievement test is not analyzed and improved to be a good quality test which cover all subject objectives. Furthermore, after the exam, there are no item analysis for improving of the test to make good quality test which can identify mastered students who are knowledgeable from non-mastered students. In addition, Too small number of good test items cause to repeat used of test items rise the problem that students can guess or know the answers before they are tested, making achievement tests result does not match their actual knowledge. Creating test bank, to collect good quality test items that are evaluated by experts. Test items have to be analyzed and improved to meet the appropriate difficulty value and discriminant value. It allows teachers to select out those test items to make a good quality test that can be used to identify the knowledge of the students more accurate, standards and reliability. Furthermore, if the number of test items are numerous enough to meet demand. Instructors can create many achievement tests with similar quality at a time to test many groups of students, and also create a quiz at the end of each lesson to evaluate the weaknesses of students who does not understand the content and suggest the appropriate online lesson to help them improve their achievement. For this reason, the researcher was interested in online test bank management system, which is the tool used to create, analyze and collect good quality test items, and used by the instructor to make standard achievement test or chapter quiz, integrated working with related online lessons to provide suggestions for each student to review non-mastered contents correctly in order to provide more efficient and reliable learning process. In addition, due to working as online system, both students and teachers can use it comfortably anyplace and anytime.

## 2. Objectives

2.1) To create an online test bank management system used to create, analyze and collect good quality test items.
2.2) To create an online test from good quality test items in test bank which covers all objectives of the subject and integrate working with related online lessons.

## 3. Research Methodology

This research is an semi-experimental research in the One Group Pretest-Posttest. Students are tested in accordance with the objectives of each subject both before and after the study. Then the test will be analyzed to evaluate the Posttest Difficulty Index and the Discriminant Index (Lou, Carey,2001; Robert, Linn & Norman, Gronlund,1995) by the formula of Hopkins and Antes (1985) and Cureton (1957) and Pretest-Posttest analysis method of Vargas (1971). Furthermore the test will be analyzed by calculating the reliability with the KR20 formula by Kuder-Richardson (Federick, 1976; Lou, 2001). There are 3 assumptions in this research: 1) each test item in the test bank has the Difficulty Index and Discriminant Index in a good level, 2) each online test which created from test bank covers all the objectives defined in the subject's curriculum and able to classify mastered students from non-mastered students, and 3) test bank management system was integrated with online lessons to provide suggestion and assist the students to review their non-mastered contents correctly to help them improve their achievement.

The instruments used in this research are test bank management website and achievement tests. The test bank management website was evaluated by three experts in the structure of the website, presentation style, design of the screen, ease of use and working performance. Then improved by the advice of experts to obtain a good quality website before used to experiment with the sample. The achievement test is the online test with 5 choices in 4 subjects, data communications and networking, operating systems, object-oriented software development and database systems. Each subject, has 200 test items which evaluated Content Validity by 3 experts with the IOC (Index of Congruence) (Payne, 2003; Leekijwattana, 2010), then select 180 items with the IOC greater than 0.5 to trial with 15 students who are not in the sample group, to analyze and select 150 test items with the difficulty index is between 0.2 - 0.8 and the discriminant index greater than 0.2 and improved according to the experts suggestion before used to experiments with the target sample group who are all students study in Wat Trimitr learning centre, Faculty of Science, Suansunandha Rajabhat University. in the year 2013-2014, which has a total of 102 students.

## 4. Result

As can be seen in Table 1 and 2. The result of the test items analysis, including Difficulty Index, Discriminant Index, Content Validity and Reliability of 4 subjects, which are 19,38,26 and 19 students respectively showed that, the Posttest Difficulty Index was explicitly higher than Pretest Difficulty Index of all subject .

Table 1. Item analysis result in each subject.

| Subject | Difficulty Index (Posttest) | | Discriminant Index (Posttest) | Difficulty Index (Pretest) | | Discriminant Index(Pretest-Posttest) |
|---|---|---|---|---|---|---|
| | Average | Max/Min | | Average | Max/Min | |
| Data Communications and Networking | 0.62 | 0.95/0.16 | 0.33 | 0.10 | 0.26/0.07 | 0.52 |
| Operating Systems | 0.57 | 0.89/0.29 | 0.29 | 0.09 | 0.21/0.03 | 0.48 |
| Object-Oriented Software Development | 0.56 | 0.92/0.12 | 0.32 | 0.12 | 0.27/0.06 | 0.45 |
| Advanced Database Systems | 0.62 | 0.89/0.16 | 0.35 | 0.11 | 0.32/0.05 | 0.51 |

Table 2. Validity and Reliability of each subject.

| Subject | Number of Students | Validity (Average IOC) | Reliability (KR20) |
|---|---|---|---|
| Data Communications and Networking | 19 | 0.93 | 0.97 |
| Operating Systems | 38 | 0.94 | 0.96 |
| Object-Oriented Software Development | 26 | 0.92 | 0.97 |
| Advanced Database Systems | 19 | 0.94 | 0.98 |

## 5. Conclusion and Discussion

According to postest item analysis the result show that all 4 subjects test have good quality with the average difficulty index between 0.56-0.62 and the discriminant index between 0.29-0.45, consistent with the first assumption, each test item in the test bank has the difficulty index and discriminant Index in a good level. Furthermore, the average difficulty index of the tests before learning are explicitly low with value between 0.09-0.12 different from difficulty index after learning significantly, and Content Validation of the online test in 4 subjects by the IOC value is between 0.92 to 0.94 with highly reliability ranged from 0.96 to 0.98 and the Pretest-Posttest discriminant index ranged from 0.45 to 0.52, consistent with the second assumption, each online test which create from test bank covers all the objectives defined in the subject curriculum and able to classify mastered. Moreover, after non-mastered students who have achievement score below 50% have reviewed the content according to system suggestions and test again, the result show that all non-mastered students have higher achievement score on average 18.27%, consistent with the third assumption, test bank management system was integrated with online lessons to provide suggestion and assist the students to review their non-mastered contents correctly to help them improve their achievement.

As the results from research, We obtain the online test bank management system and some good quality test items stored in the test bank as seen in table 3, which instructors can use to create an online tests as mention in research objectives. However, although the experiment hold on the entire students in Wat Trimitr learning centre, but the sample size is very small. So, if someone want to use these test items to create achievement test. They should bring these test items to trial with the other student group to increase the sample size and make the results more reliable.

Table 3. Number of good quality test items in each subject.

| Subject | Number of good quality test items |
|---|---|
| Data Communications and Networking | 126 |
| Operating Systems | 136 |
| Object-Oriented Software Development | 126 |
| Advanced Database Systems | 132 |

## 6. Suggestion

In this study we found that, a good quality test will help both students and teachers to conduct learning process with more efficiency. The instructor can create a test for students to evaluate student's knowledge after the end of each chapter. This will make students aware of their weaknesses corresponding to non-mastered contents , and help teachers to evaluate their student's knowledge to improve learning plans, focusing on student non-mastered content, provide more examples or review the lesson more correctly. However, to achieve the aforementioned. The online test bank must have sufficient numbers of good test items. So that the instructor can choose to create a test that meets the objectives of subject's curriculum without worrying that the students have seen the test before or sneak answers of others. So the instructor must issue more new test items regularly, used these test items to test students, analyze and improve the quality of test items and stored in test bank increasingly.

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